

Purnendu

<https://purnendu.me/> ATLAS Institute, University of Colorado, Boulder +1 720-757-2680 purnendu@colorado.edu

Interests	Personal Fabrication, Human-centered programmable materials, Nano-materials and Nanofabrication, Soft Robotics, Microfluidics, Graphene and its derivatives.
Education	<p>PhD (Creative Technology and Design) 2018-2023 (expected) ATLAS INSTITUTE, UNIVERSITY OF COLORADO BOULDER</p> <p>Interdisciplinary research at the intersection of Design, Nanotechnology and Computer Science. Advisors: Carson Bruns (Mechanical Engineering and ATLAS) and Daniel Leithinger (Computer Science and ATLAS)</p> <p>Integrated M. Sc. (Physics) 2013-2018 INDIAN INSTITUTE OF TECHNOLOGY (IIT), ROORKEE</p> <p>Specialization in Material Science (Condensed Matter Physics) and Nanofabrication. Pursued an interdisciplinary master's thesis in collaboration with Max Planck Institute for Informatics, Germany</p> <p>Master's Thesis 2017-2018 MAX PLANCK INSTITUTE FOR INFORMATICS</p> <p>Advised by Prof. Jürgen Steimle, at the Human-Computer Interaction Group in Saarland Informatics Campus, Saarbrücken, Germany. Worked on Acoustic Metamaterials.</p>
Experience	<p>Graduate Research Assistant 2018- (present) ATLAS INSTITUTE, UNIVERSITY OF COLORADO BOULDER</p> <p>Interdisciplinary research with the Laboratory for Emergent Nanomaterials (with Carson Bruns) and THING Lab (with Daniel Leithinger)</p> <p>Research Intern MAY 2017-JULY 2017 BAUHAUS UNIVERSITY, WEIMAR, GERMANY</p> <p>Advised by Prof. Eva Hornecker, Human-Computer Interaction chair at Bauhaus-Universität Weimar. Worked on shape-changing soft robotic TUIs (Tangible User Interfaces) and ultrasonic sensing.</p> <p>Co-founder and President SEPT. 2016-APR. 2017 DESIGN STUDIO, IIT ROORKEE</p> <p>Design Studio, IIT Roorkee is a multidisciplinary studio managed by students at Indian Institute of Technology, Roorkee dedicated to design-oriented research and product development with a stronghold in Human-Computer Interaction, Augmented Reality, Product Design, Game development, Animation and Graphics etc. (https://designstudio.cc/). I co-founded the group and lead it from its inception as the Founding President.</p> <p>Co-founder and Tech Lead Sept. 2015-Oct.2016 LOG 9 MATERIALS</p> <p>Log 9 Materials is an Indian startup aiming at the commercial applications of lab-scale graphene nanotechnology and manufacturing high-quality nano-materials (primarily graphene). (www.log9materials.com). As Tech Lead my responsibilities were to look after the overall Research and Development, Innovation, Device Design Fabrication. Designed and fabricated a Graphene Quantum Dots (GQD) based LED and graphene-based multi-action water purification system. Designed and developed PPuF - a graphene-ceramic composite based cigarette filter which lowers the carcinogens in cigarette smoke by 50-60 % (www.ppuF.co.in).</p> <p>Undergraduate Researcher May 2015-Nov.2017 (With an interim break for startup) SATAPATHI LAB, IIT ROORKEE</p> <p>Worked on a variety of projects in instrumentation, nanofabrication, microfluidics, additive manufacturing, organic electronics and Biomaterials under the supervision of Dr. Soumitra Satapathi, Asst. Professor, Dept. Of Physics, IIT Roorkee. (http://satapathilab.com/)</p>

Freelance User Interface and User Experience (UI/UX) Designer

Dec. 2013-May.2015

ROORKEE

Managed a wide variety of cross-media projects involving branding, illustrations, animations, products, UI-UX design, and development for startups (Inst-E-Shop, AAYUU.com, to name a few) as well as industry leaders.

Publications

HASEL-UI: A toolkit for electrostatically driven Shape-Changing Interfaces

Purnendu, Eric Acome, Daniel Leithinger, Christoph Keplinger, Carson Bruns [Under submission for CHI 2021]

Graphene-Based 3D Xerogel as Adsorbent for Removal of Heavy Metal Ions from Industrial Wastewater

Purnendu, Soumitra Satapathi, 5, 2, 96-102,2017, Journal of Renewable Materials.

Patents

[2020] Method and apparatus for multi-material variable resolution Palmtop 3D printing

Purnendu, Carson Bruns, Mark D Gross [Provisional Patent Application No 63/061,653 (pending)]

[2017] A graphene based tobacco smoke filter and a method for synthesizing graphene composition

Akshay V. Singhal, Purnendu [WO 2017187453 A1]

[2016] Device and method for real-time thickness controlled spin-coating

Nipun Sawhney, Purnendu, Soumitra Satapathi [E-106/43/2016/DEL/201611039173 - (pending)]

Posters

Graphene-Chitosan Xerogel for Heavy Metal Ion Removal

Purnendu, Soumitra Satapathi, International Conference On Nanoscience and Technology (ICONSAT), 2016, IISER PUNE

Awards

INSPIRE Scholarship for Higher Education (SHE)

Department of Science and Technology (DST), Govt. of India (2013-18).

Invitations and Talks

Manipulating Shape of Things to come: Folding and Self Assembly

ATLAS Seminar, University of Colorado Boulder, 14 April 2020.

The mathematical secrets of Computational Origami

Statistics, Optimization and Machine Learning Seminar, University of Colorado Boulder, 15 Oct. 2019.

Future of Graphene in manufacturing

Short-term program on Make-In-India-Issues and Challenges, NITTTR Chandigarh, 10 Nov. 2017

Special Invitee at Make-In-India Week, Mumbai, 13-18 Feb. 2016.

Services

Reviewer

CHI 2019, 2020, 2021

Mentoring

Marian Baldonado

Social Impact Master's student in Creative Technology and Design, University of Colorado Boulder

Cassidy Jensen

Undergraduate student in Creative Technology and Design, University of Colorado Boulder; Project: Acoustic Metamaterials

Vishal Shenoy

Master's student in Mechanical Engineering, University of Colorado Boulder

Graduate Coursework

CU Boulder:

Haptic Interfaces, Design and Analysis of Algorithms, Natural Language Processing, Applied Machine Learning, Theory of Computation, Metamaterial Design Principles, Partial Differential Equations, Bio-inspired Multi-Agent Systems, Quantum Information and Computing

IIT Roorkee:

Advanced Condensed Matter Physics, Physics of Nanosystems, Physics and Technology of Thin Films, Advanced Characterization Techniques, Molecular Spectroscopy and Lasers

Skills

ADVANCE SKILLS in Design thinking, Design software in both 2D and 3D

(Adobe Creative Suite, Autodesk Softwares, Rhino with Grasshopper, Cinema-4D, Blender).

ADVANCE SKILLS in Nano-material fabrication and experimentation

Including microfluidic control and study, soft-lithography, photolithography, thin film deposition, nanofabrication, chemical fabrication, wet-lab techniques, different types of spectroscopy (Fluorescence, UV-Visible, FTIR), X-Ray Diffraction, Atomic Force Microscopy and Electron Microscopy (SEM,TEM, STM) and instrumentation.

ADVANCE SKILLS in macro-scale instrumentation, prototyping, and digital fabrication

3D printing, cutting, molding, casting; instrumentation of most digital machines to handle plastic/composite/metal/wood.

MEDIUM SKILLS in software development and scientific computing

Graphics, Animation, Interface and Machine Learning in Python, MATLAB, Javascript, FORTRAN.

MEDIUM SKILLS in electronic hardware design and assembly

Digital and analog circuit design, signal processing, microprocessors, fast-prototyping as well as machine building

BASIC SKILLS in biological engineering, bacteria culture.

Fluent in spoken and written English, Hindi, and Maithili-eastern Indian-subcontinent language (mother tongue)

References

Carson Bruns

Assistant Professor, Department of Mechanical Engineering and ATLAS Institute, University of Colorado Boulder; E-Mail: carson.bruns@colorado.edu; Homepage: <https://www.colorado.edu/atlas/carson-bruns>

Mark D Gross

Director, ATLAS Institute Professor, Department of Computer Science and ATLAS Institute, University of Colorado Boulder; E-Mail: mdgross@colorado.edu; Homepage: <http://mdgross.net/>

Daniel Leithinger

Assistant Professor, Department of Computer Science and ATLAS Institute, University of Colorado Boulder; E-Mail: daniel.leithinger@colorado.edu; Homepage: <https://www.colorado.edu/atlas/daniel-leithinger>